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EXAMINER	
LE, JOHN H	

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 09/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/750,103	BAILEY ET AL.	
	Examiner	Art Unit	
	John H. Le	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *45* is/are allowed.

6)☐ Claim(s) *1,2 and 4-44* is/are rejected.

7)☒ Claim(s) *3 and 46-51* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *07/15/05, 05/19/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

1. This office action is in response to applicant's amendment received on 07/15/2005.

Claims 1, 14, 20, 27, 33, 39, and 45 have been amended.

Claims 46-51 have been added.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-2, 14, 20, 27, 33, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stein et al. (USP 6,192,751) in view of Ziegler et al. (USP 4,730,650) and Lynworth et al. (USP 5,440,937).

Regarding claims 1-2, 14, 20, 27, 33, and 39, Stein et al. disclose a system for measuring fluid in a container (tank)(e.g. Figs.2-3, Col.5, lines 12-35), the system comprising: one or more transducers (14) operable to: introduce an elastic wave to a container wall, detect an elastic wave that has propagated at least partially around a container wall, and generate a signal representative of a detected the elastic wave; and a computer (signal processor 26) operable to determine a state of a fluid in a container based on a signal representing an elastic wave that has propagated at least partially around a container wall (e.g. Col.2, lines 54-61, Col.9, lines 3-11).

Stein et al. fail to disclose the transducer is a vibration transducer and one or more transducers operable to detect an instructed vibration that has at least partially around a container wall in more than one vertical propagation direction.

Ziegler et al. teach a transducer (4) that introduce a vibration to a container wall; detect an introduced vibration that has propagated at least partially around a container wall (e.g. Fig.3, Abstract, Col1, lines 8-13, Col.3, lines 15-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a transducer that introduce a vibration to a container wall; detect an introduced vibration that has propagated at least partially around a container wall as taught by Ziegler et al. in a system for measuring fluid in a container of Stein et al. for the purpose of providing a device for detecting filling level of liquid in a container (Ziegler et al., Abstract).

Lynworth et al. teach more than one transducers (16, 17) operable to detect an instructed vibration that has at least partially around a container wall in more than one vertical propagation direction (e.g. Fig.2, Col.3, lines 36-43, Col.6, lines 17-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include more than one transducers (16, 17) operable to detect an instructed vibration that has at least partially around a container wall in more than one vertical propagation direction as taught by Lynworth et al. in a system for measuring fluid in a container of Stein et al. in view of Ziegler et al. for the purpose of providing a process and apparatus for ultrasonic measurement of volumeric flow through large-diameter stack.

4. Claims 1-2, 5-12, 14-18, 20-24, 26-31, 34-37, 39, and 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stein et al. (USP 6,192,751) in view of Fred Schloss et al. (USP 3,224,246) and Lynworth et al. (USP 5,440,937).

Regarding claims 1-2, 14, 20, 27, 33, and 39, Stein et al. disclose a system for measuring fluid in a container (tank)(e.g. Figs.2-3, Col.5, lines 12-35), the system comprising: one or more transducers (14) operable to: introduce an elastic wave to a container wall, detect an elastic wave that has propagated at least partially around a container wall, and generate a signal representative of a detected the elastic wave; and a computer (signal processor 26) operable to determine a state of a fluid in a container based on a signal representing an elastic wave that has propagated at least partially around a container wall (e.g. Col.2, lines 54-61, Col.9, lines 3-11).

Regarding claims 5-6, 26, Stein et al. disclose the one or more transducers (14, 16) are adapted to couple to the exterior of a container (Fig.1), a fluid state comprises a fluid level (e.g. Col.9, lines 3-11).

Stein et al. fail to disclose the transducer is a vibration transducer and one or more transducers operable to detect an instructed vibration that has at least partially around a container wall in more than one vertical propagation direction.

Fred Schloss et al. teach a vibration motion of a container means produces elastic wave in the liquid pool (e.g. Col.4, lines 69-71, Col.6, lines 42-43).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a vibration motion of a container means produces elastic wave in the liquid pool as taught by Fred Schloss et al. in a system for measuring fluid

in a container of Stein et al. for the purpose of providing a hydrophone calibrator unit and a sturdy environmental test container (Fred Schloss et al., Col.2, lines 11-29).

Lynworth et al. teach more than one transducers (16, 17) operable to detect an instructed vibration that has at least partially around a container wall in more than one vertical propagation direction (e.g. Fig.2, Col.3, lines 36-43, Col.6, lines 17-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include more than one transducers (16, 17) operable to detect an instructed vibration that has at least partially around a container wall in more than one vertical propagation direction as taught by Lynworth et al. in a system for measuring fluid in a container of Stein et al. in view of Fred Schloss et al. for the purpose of providing a process and apparatus for ultrasonic measurement of volumeric flow through large-diameter stack.

Regarding claims 7 and 21, Stein et al. disclose the computer (signal processor 26) determines a fluid state in a container (e.g. Col.9, lines 3-11) based on the time for an introduced vibration (elastic wave 28) to propagate at least partially around a container wall to a detecting transducer (14, 16)(e.g. Col.4, lines 32-38).

Regarding claims 8 and 22, Stein et al. disclose the computer (signal processor 26) determines a fluid state in a container (e.g. Col.9, lines 3-11) based on the amplitude of an introduced vibration at detection (elastic wave 28)(e.g. Col.7, lines 50-64).

Regarding claims 9 and 23, Stein et al. disclose the computer (signal processor 26) determines a fluid state in a container based on: the time for an introduced vibration

to propagate at least partially around a container wall to a detecting transducer (14, 16)(e.g. Col.4, lines 32-38); and the amplitude of the introduced vibration at detection (elastic wave 28)(e.g. Col.7, lines 50-64).

Regarding claims 10-11, 18, 24, 31, 37, and 43 the combination of Stein et al. in view of Fred Schloss et al. and Lynworth et al. disclose the computer (signal processor 26) is further operable to control an introducing transducer (signal processor 26 driving the transmitting transducer 14 to transmit an elastic wave characteristic)(Fig.1, Col.2, lines 49-54); the computer (signal processor 26) is operable to control the amplitude (e.g. Col.7, lines 50-64) and frequency of vibrations introduced by the introducing transducer (e.g. Col.7, lines 5-18);

Regarding claim 12, Stein et al. disclose the computer (signal processor 26) is further operable to determine a second fluid state (different level of fluid) (e.g. Fig.2, Col.3, lines 3-13, Col.4, lines 42-67).

Regarding claims 15-17, 28-30, and 34-36, 40-42, Stein et al. disclose determining a fluid state based on the detection of the vibration comprises determining the time for the vibration to propagate at least partially around the container wall to a detection point (e.g. Col. 7, lines 23-49); determining a fluid state based on the detection of the vibration comprises determining the amplitude of the vibration at detection (e.g. Col.7, lines 50-64); determining a fluid state based on the detection of the vibration comprises: determining the time for the vibration to propagate at least partially around the container wall to a detection point (e.g. Col.4, lines 32-38); and determining the amplitude of the vibration at detection (e.g. Col.7, lines 50-64).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include more than one transducers (16, 17) operable to detect an instructed vibration that has at least partially around a container wall in more than one vertical propagation direction as taught by Lynworth et al. in a system for measuring fluid in a container of Stein et al. in view of Fred Schloss et al. for the purpose of providing a process and apparatus for ultrasonic measurement of volumeric flow through large-diameter stack.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stein et al. (USP 6,192,751) in view of Fred Schloss et al. (USP 3,224,246) and Lynworth et al. (USP 5,440,937) as applied to claims 1-2 above, and further in view of Utran ("Modern Ultrasonic Tranducers", 1999).

Regarding claims 4, the combination of Stein et al., Fred Schloss et al., and Lynworth et al. (USP 5,440,937) discussed supra, discloses the claimed invention except the first transducer generates a vibration between approximately 30 kHz and 150 kHz.

Utran ("Modern Ultrasonic Transducers", 1999) discloses a transducer generates a vibration between approximately 30 kHz and 150 kHz (e.g. "Modern Ultrasonic Transducers", Page 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a transducer generates a vibration between approximately 30 kHz and 150 kHz as taught by Utran in a system for measuring fluid in a container of Stein et al. in view of Fred Schloss et al. and Lynworth et al. for the

purpose of providing propagating ultrasound for analyzing the transmitted signals in a given medium (Utran, Page 6, paragraph 1).

6. Claims 13, 19, 25, 32, 38, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stein et al. (USP 6,192,751) in view of Fred Schloss et al. (USP 3,224,246) and Lynworth et al. (USP 5,440,937) as applied to claims 1-2 above, and further in view of Foreman et al. (USP 3,958,458).

Regarding claims 13, 19, 25, 32, 38, and 44, the combination of Stein et al., Fred Schloss et al., and Lynworth et al. discussed supra, discloses the claimed invention except a wireless communication device operable to send a wireless signal representing a generated signal to the computer.

Foreman et al. discloses a wireless communication device operable to send a wireless signal representing a generated signal to the computer (e.g. Col.1, lines 61-65, Col.5, lines 44-48, lines 58-61).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a wireless communication device as taught by Foreman et al. in a system for measuring fluid in a container of Stein et al. in view of Fred Schloss et al., and Lynworth et al. for the purpose of providing a an acoustic emission fluid flow measurement system for determination of change in fluid flow direction and fluid density (Shinha, Col.3, lines 9-23).

Allowable Subject Matter

7. Claim 45 is allowed.

8. Claims 3, 46-51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3, none of the prior art of record teaches or suggests the combination of a system for measuring fluid in a container, wherein the system comprising: one or more transducers operable to introduce a vibration to a container wall, detect an introduced vibration that has propagated at least partially around a container wall in more than one vertical propagation direction, and generate a signal representative of a detected vibration; and a computer operable to determine a state of a fluid in a container based on a signal representing an introduced vibration that has propagated at least partially around a container wall in more than one vertical propagation direction, wherein the one or more transducers comprises a first transducer, the first transducer operable to introduce a vibration to a container wall, wherein the first transducer comprises an air transducer. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 45, none of the prior art of record teaches or suggests the combination of a system for measuring fluid in a container, wherein the system comprising: a container for holding a fluid, the container comprising a wall having an

inner surface and an exterior surface; a first transducer coupled to the exterior surface of the container wall near the top of the container, the first transducer operable to introduce a vibration to the container wall; a second transducer coupled to the exterior surface of the container wall near the top of the container, the second transducer operable to detect the vibration after it has propagated at least partially around the container wall and to generate a signal representative of the vibration at detection; a wireless communication device coupled to the second transducer, the wireless communication device operable to send a wireless signal representing the generated signal; and a second wireless communication device, the second wireless communication device operable to receive the wireless signal; a computer coupled to the second wireless communication device, the computer operable to: determine if a signal representative of the vibration at detection has been received; determine a fluid mass in the container based on the time for the vibration to propagate at least partially around the wall from the first transducer to the second transducer, determine a fluid volume based on the fluid mass, determine a fluid level based on the fluid volume, and control the amplitude and frequency of the vibration introduced by the first transducer. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 46, none of the prior art of record teaches or suggests the combination of a system for measuring fluid in a container, wherein the system comprising: one or more transducers operable to introduce a vibration to a container

wall, detect an introduced vibration that has propagated at least partially around a container wall in more than one vertical propagation direction, and generate a signal representative of a detected vibration; and a computer operable to determine a state of a fluid in a container based on a signal representing an introduced vibration that has propagated at least partially around a container wall in more than one vertical propagation direction, the one or more transducers are further operable to detect an introduced vibration that has propagated at least a majority of the way around a circumference of a container wall in more than one vertical propagation direction; and the computer is further operable to determine a state of a fluid in a container based on a signal representing an introduced vibration that has propagated at least a majority of the way around a circumference of a container wall in more than one vertical propagation direction. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 47, none of the prior art of record teaches or suggests the combination of a method for measuring fluid in a container, the method comprising: introducing a vibration to a. container wall; detecting the vibration in the container wall after the vibration has propagated at least partially around the container wall in more than one vertical propagation direction; and determining a state of a fluid in the container based on the detection of the vibration, wherein detecting the vibration in the container wall after the vibration has propagated at least partially around the container wall in more than one vertical propagation direction comprises detecting the vibration

after it has propagated at least a majority of the way around a circumference of the container wall. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 48, none of the prior art of record teaches or suggests the combination of a system for measuring fluid in a container, the system comprising: means for introducing a vibration to a container wall; means for detecting an introduced vibration that has propagated at least partially around a container wall in more than one vertical propagation direction and for generating a signal representing a vibration at detection; and means for determining a state of a fluid in a container based on a signal representing an introduced vibration that has propagated at least partially around a container wall, wherein the means for detecting an introduced vibration that has propagated at least partially around a container wall in more than one vertical propagation direction and for generating a signal representing a vibration at detection is further operable to detect an introduced vibration that has propagated at least a majority of the way around a circumference of a container wall in more than one vertical propagation direction; and the means for determining a state of a fluid in a container based on a signal representing an introduced vibration that has propagated at least partially around a container wall is further operable to determine a state of a fluid in a container based on a signal representing an introduced vibration that has propagated at least a majority of the way around a circumference of a container wall in more than one vertical propagation direction. It is these limitations as they are claimed in the

combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 49, none of the prior art of record teaches or suggests the combination of a method for measuring fluid in a container, the method comprising: receiving a signal representing a vibration detected after being introduced to and propagating at least partially around a container wall in more than one vertical propagation direction; and determining a state of a fluid based on the signal, wherein receiving a signal representing a vibration detected after being introduced to and propagating at least partially around a container wall in more than one vertical propagation direction comprises receiving a signal representing a vibration detected after being introduced to and propagating at least a majority of the way around a circumference of a container wall in more than one vertical propagation direction. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 50, none of the prior art of record teaches or suggests the combination of a system for measuring fluid in a container, the system comprising: a computer operable to: determine whether a signal representing a vibration detected after being introduced to and propagating at least partially around a container wall in more than one vertical propagation direction has been received, and determine a state of a fluid based on the signal, wherein the computer is further operable to determine a state of a fluid in a container based on a signal representing a vibration detected after

being introduced to and propagating at least a majority of the way around a circumference of a container wall in more than one vertical propagation direction. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 51, none of the prior art of record teaches or suggests the combination of an article comprising a machine-readable medium storing instructions operable to cause one or more machines to perform operations comprising: determining whether a signal representing a vibration detected after being introduced to and propagating at least partially around a container wall in more than one vertical propagation direction has been received; and determining a state of a fluid based on the signal, wherein determining a state of a fluid based on the signal comprises determining a state of a fluid in a container based on a signal representing a vibration detected after being introduced to and propagating at least a majority of the way around a circumference of a container wall in more than one vertical propagation direction. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Response to Arguments

9. Applicant's arguments filed 07/15/2005 have been fully considered but they are not persuasive.

-Applicant argues that the prior did not teach "one or more transducers operable to detect an introduced vibration that has propagated at least partially around a container wall in more than one vertical propagation direction" as cited in claims 1, 14, 20, 27, 33, and 39.

Examiner position is that Lynworth et al. teach more than one transducers (16, 17) operable to detect an instructed vibration that has at least partially around a container wall in more than one vertical propagation direction (e.g. Fig.2, Col.3, lines 36-43, Col.6, lines 17-35).

-Applicant argues that the prior did not teach, "the computer is further operable to control an introducing" as cited in claims 10, 18, 24, 31, 37, and 43.

Examiner position is that the combination of Stein et al. of Fred Schloss et al. and Lynworth et al. teach the computer (signal processor 26) is further operable to control an introducing transducer (signal processor 26 driving the transmitting transducer 14 to transmit an elastic wave characteristic)(Fig.1, Col.2, lines 49-54).

-Applicant argues that the prior did not teach, "the computer is further operable to determine a second fluid state" as cited in claim 12.

Examiner position is that Stein et al. teach the computer (signal processor 26) is further operable to determine a second fluid state (determining different level of fluid or determining second level of fluid) (e.g. Fig.2, Col.3, lines 3-13, Col.4, lines 42-67).

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Specifically Lynworth et al. has been added to second ground of rejection.

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H. Le whose telephone number is 571 272 2275. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on 571 272 2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John H. Le

Patent Examiner-Group 2863

September 19, 2005

BRYAN BUI
PRIMARY EXAMINER